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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 017.38874X00

First Inventor or Application Identifier Zhang YING

Title See 1 in Addendum

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 18]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 3]
4. Oath or Declaration [Total Pages]
 - a. ☐ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

* NOTE FOR ITEMS 1 & 13 IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
9. ☐ English Translation Document (if applicable)
10. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. ☐ * Small Entity Statement(s) ☐ Statement filed in prior application
(PTO/SB/09-12) ☐ Status still proper and desired
14. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. ☐ Other:

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: /

Prior application information: Examiner

Group / Art Unit:

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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See 37 C.F.R. §§ 1.27 and 1.28

TOTAL AMOUNT OF PAYMENT (\$846.00)

Complete if Known

Application Number
Filing Date September 26, 2000
First Named Inventor Zhang YING
Examiner Name
Group / Art Unit
Attorney Docket No. 017.38874X00

511 U.S. PTO
09/26/00
09/26/00

METHOD OF PAYMENT (check one)

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
101	690	201	345	Utility filing fee	690.00
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	690	208	345	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) (\$ 690.00)

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
18	-20**=0	18	0
5	-3**=2	78	156
Multiple Dependent			0

**or number previously paid, if greater; For Reissues, see below

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
103	18	203	9	Claims in excess of 20	
102	78	202	39	Independent claims in excess of 3	
104	260	204	130	Multiple dependent claim, if not paid	
109	78	209	39	** Reissue independent claims over original patent	
110	18	210	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$ 156.00)

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	0.00
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	0.00
139	130	139	130	Non-English specification	0.00
147	2,520	147	2,520	For filing a request for reexamination	0.00
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	0.00
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	0.00
115	110	215	55	Extension for reply within first month	0.00
116	380	216	190	Extension for reply within second month	0.00
117	870	217	435	Extension for reply within third month	0.00
118	1,360	218	680	Extension for reply within fourth month	0.00
128	1,850	228	925	Extension for reply within fifth month	0.00
119	300	219	150	Notice of Appeal	0.00
120	300	220	150	Filing a brief in support of an appeal	0.00
121	260	221	130	Request for oral hearing	0.00
138	1,510	138	1,510	Petition to institute a public use proceeding	0.00
140	110	240	55	Petition to revive - unavoidable	0.00
141	1,210	241	605	Petition to revive - unintentional	0.00
142	1,210	242	605	Utility issue fee (or reissue)	0.00
143	430	243	215	Design issue fee	0.00
144	580	244	290	Plant issue fee	0.00
122	130	122	130	Petitions to the Commissioner	0.00
123	50	123	50	Petitions related to provisional applications	0.00
126	240	126	240	Submission of Information Disclosure Stmt	0.00
581	40	581	40	Recording each patent assignment per property (times number of properties)	0.00
146	690	246	345	Filing a submission after final rejection (37 CFR § 1.129(a))	0.00
149	690	249	345	For each additional invention to be examined (37 CFR § 1.129(b))	0.00
Other fee (specify)					0.00
Other fee (specify)					0.00

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 0.00)

SUBMITTED BY

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Signature		Date 09/26/00

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1. SYSTEM FOR SELECTING DATA COMMUNICATIONS SERVICE

SYSTEM FOR SELECTING DATA COMMUNICATIONS SERVICEBACKGROUND OF THE INVENTIONField of the Invention

This invention relates generally to a system for selecting a data communications service, and more particularly to a system for selecting a preferred service using a decision making agent and based on decision making logic.

Background

The use of data communications has become very common, to the point that in some cases, companies and individuals may have a choice between services which they use. That is, they may be connected to a number of different providers who have different pricing schemes. In addition, some providers may have better quality of service or better security. If a company or individual is connected to a number of different providers, it is necessary to determine which provider to use for each job.

For a larger company, it is possible that several different providers are accessible through a plurality of channels to obtain various types of data communications service. For example, it is possible to have channels through an incumbent local exchange carrier, such as one of the legacy providers, like AT&T™. The company may also have a channel for competitive local exchange carriers, such as

COVAD. There may also be channels from internal information technology support and external information technology providers. Internet service providers may also be connected. The company may also have more than one access devices such as voice band modems, any one of a set of new technologies which provide high speed data transmission such as HDSL, ADSL, SDSL, IDSL, or VDSL or a cable modem.

Of course, if the user has only a single provider, there is no choice to make. Also, if there are a very small number of choices, it may be easy to determine which to use on a manual basis. However, for companies which have a number of different types of channels provided by different services, the billing schemes and other parameters may be quite complex and difficult to compare for different situations. Accordingly, it is helpful to have a built-in system for automatically determining which provider will provide the most appropriate service for a given situation.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides a system for deciding which of several service providers to use.

The invention also provides an apparatus for deciding which service provider to use based on certain decision making logic.

The present invention also provides a method for making a decision concerning which service provider to use based on certain decision making logic.

The present invention further provides a system for making a decision concerning which data service provider should be used based on certain decision making logic and decision making criteria.

5 The present invention still further provides a system for determining which data communications service provider should be selected based on certain decision making logic, certain decision making criteria and certain basic information concerning each potential provider.

10 Briefly, this invention is achieved by providing a series of databases regarding the billing policy and other parameters of the various providers and a decision making agent which utilizes specific decision making criteria and decision making logic to make the decision as to which service provider to use based on the information in the databases.

BRIEF DESCRIPTION OF THE DRAWINGS

20 A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Figure 1 is a block diagram showing a system description of the present invention;

25 Figure 2 is a block diagram of a sample system according to the present invention;

Figure 3 is a flow chart showing the steps of the method according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to Figure 1 thereof, wherein a block diagram of the system 10 is shown. A user interface 12 is provided so that the user can input information for the databases and input other information regarding other variables such as the type of use for the connection. Any additional quality requirements can also be input by the user. In addition, when a decision has been made as to the most appropriate provider, this will be displayed to the user through the interface so that he may accept or reject the suggestion. The user may also input a decision manually if he is not happy with the suggested provider.

A quality of service database 14 is provided for storing preconfigured service quality requirements for each service type. This would include delay tolerance, jitter, error or loss tolerance, etc. Some basic requirements for certain applications such as minimum bandwidth are also enclosed in this database. New information can be added to the other database regarding other new service type requirements through the user interface.

Resource database 16 is also provided into which other information regarding parameters of the providers are included. For example, this database can include four parts for different types of information. A resource condition database includes information related to current time and resource states such as the user amount and total throughput. This information can be updated with current online log state information with the more recent information having a higher weight than past information.

The internet service provider resource condition database is assembled in two phases. In the initialization stage, information is input through the user interface about speed pricing policy, etc. Also, if a new connection is added, it is also input manually at that time. The second phase is on-line tracking, for example, through Microsoft Windows™ systems. In this arrangement, you can check the dial-up modem on-line speed and also check the internet protocol throughput of the dial up server.

Another part of the resource database is the resource basic information 20 which includes basic information regarding each provider such as the maximum and minimum bandwidth, the value added service provided and so on. A third part of the database includes billing policies of the providers. Such policies may be complex and may be time dependent, duration dependent or dependent on the amount of information. A fourth part of the database includes selection priorities 24 which can be input manually by the

user or may be set by the result of a history normalization. Other parts of this database may also be included to provide any additional information regarding the providers which may be of interest to the decision.

5 A tracking and logging agent 26 provides real time state of each on-line provider and provides a log of typical information for each provider. This information is used to update the resource condition database. The tracking and logging agent may also be provided with information from a resource state monitor 28 which provides physical
10 information such as line rates and statistical information such as the user amount, service duration, usability time, equipment usage and information amount of the streams for each resource. The tracking and logging agent may also be
15 connected to a time and date agent which merely provides the time and date to help give accurate logs.

 The information from these various databases is provided to the decision making agent 32 so that a decision can be made concerning which service provider to use. The
20 decision making agent receives information from the user interface as to the type of use desired and other basic information regarding the specific job at hand. The decision making agent can draw on the decision making logic
36 which has several different logic arrangements based on
25 different decision criteria, such as the connection duration sensitivity which is related to the service capability of each resource, a cost sensitive logic, related to the

billing policies and service type, and a quality sensitivity logic which relates to the quality of transmission.

The decision making agent also can receive data regarding the particular criteria to be utilized in making the decision. Thus, the criteria may indicate what parameter should be controlling in making the decision. That is, whether price is the only factor, or whether service or security are more important. This may be input through the user interface along with other information about the specific job or it may be determined based on stored guidelines about different types of situations. This criteria determines which logic to choose from logic circuit 36. This criteria can be user specific and also related to the database. For example, in the pricing criteria, it may have various aspects such as monthly pricing, pricing per user, pricing per click, pricing bandwidth, pricing per packet, pricing per transaction, etc. The decision making is based on certain specific criteria. If the criteria is cost sensitive, then the cheapest rate from the database at a specific time is chosen. If the criteria is time sensitive, then the provider with the highest line rate or internet traffic throughput listed in the database may be chosen. For more complex situations, there may be a confidential sensitive service so that a virtual private network may be chosen rather than a normal service provider.

When the decision making agent is called upon to select a provider, the specific type of decision making logic

specified by the decision making criteria will be utilized
in order to establish a logic scheme for making the
decision. The databases are drawn upon to provide the basic
information onto which the decision making logic scheme is
5 applied. Once a decision has been reached, the suggested
provider is displayed to the user through the interface.
Whether the user accepts this decision or overrides it and
provides a new provider choice, this choice is either
directly handled by the user on a manual basis or provided
10 to the implementation agent 38 which automatically
establishes a connection with the selected provider.

If the specific job for which the provider was selected
does not need to be handled on a real time basis, it is
possible to send the information to a scheduled item agent
15 40 rather than automatically connecting to the provider at
that time. The scheduled item agent will then make the
connection at a later time, perhaps when the data streams in
the providers are lighter or when the connections from the
user are less busy. It may also be possible to delay the
20 connection in order to obtain a better pricing schedule.
The decision as to when to make the connection can also be
determined by the decision making agent at the same time
that the provider is selected, since the decision may be
interrelated.

25 For example, in order to choose the best internet
service provider connection for a certain task, the system
may operate in the following manner. Based on the internet

service provider connection database and the service requirements from the service requirement database, a decision making agent can provide a selection decision according to various types of criteria, such as cost sensitive, time duration sensitive or quality sensitive. Based on this, it can provide a scheduled connection suggestion and implementation.

Figure 2 shows a system which is a specific implementation of the system of Figure 1. This arrangement may be appropriate for a residential user with a limited number of providers to choose from. The general arrangement of elements is similar to that shown in Figure 1. The system 50 is shown as including a user interface 52 which corresponds to interface 12 in Figure 1. A service requirements database 54 is similar to the quality of service database 14 in Figure 1. In this case, the database lists the requirements for the services which are available to this residential user. A connections database 56 is similar to the resource database 16 in Figure 1. It also includes four parts including line condition data in 58, connection information in section 60, billing policies in section 62 and selection priorities in section 64. These four correspond to sections 18 to 24 in Figure 1. However, they are directed to a much smaller number of possible connections. The connections database is also assembled in two phases. In the initialization stage, information is input through the user interface. Similarly, if a new

connection is added it is also input manually. The second phase involves on-line tracking using a tracking and logging agent 66. The tracking and logging agent is similar to agent 26 shown in Figure 1. Also, the connection monitor 68 monitors the state of various connections in a fashion similar to monitor 28 in Figure 1. Time and date agent 70 is similar to the same agent 30 in Figure 1. The decision making agent 72 and associated decision making criteria 74 and decision making logic 76 are similar to the same circuits 32-36 shown in Figure 1. A connection set-up agent 78 provides a connection with the selected provider in a similar fashion to the implementation agent 38 in Figure 1. Also, the scheduled connection agent 80 provides a schedule for connecting to various providers in the future in a similar fashion to scheduled item agent 40 in Figure 1. Thus, this system operates in a similar fashion to Figure 1 in that basic information about the various providers is provided through the interface. The decision making agent draws on the decision making logic and the decision making criteria to provide a logic scheme for making the decision. Databases 54 and 56 provide information about the providers so that a decision can be made based on these parameters. Once a decision is made, it is displayed to the user so that he can accept it or indicate his different choice. The result is then either scheduled in agent 80 for later connection or connection set-up agent 78 provides the connection at that time.

While these two figures have been described in terms of specific circuits to provide these different functions, it is also possible to utilize a general purpose computer with specific programming for each of these functions.

5 Figure 3 shows the basic steps of making a decision using the system shown in Figure 1. In step 100 the user indicates that he wishes to make a connection and also provides some information about the particular job situation and the necessary parameters associated therewith. These parameters might include the length of time estimated for a connection, the importance of the information, the necessity for security and the timeliness of the information.

10 In step 102, the decision making agent will call up data from the databases 14 and 16 to determine the present situation regarding the providers and also the basic requirements of quality for the service. The decision making agent will also then in step 104 receive the decision criteria from the decision making criteria unit 34. The criteria will indicate which logic to choose from the
15 decision making logic unit 36 which is then forwarded to the decision making agent in step 106.

20 In step 108, the decision making agent will then apply the appropriate decision making logic to the specific data involved in this situation in order to make a decision as to which provider to choose. The decision is made in step 110. At the time, a decision is made as to whether the connection should be made at the present time or should be deferred
25

until later. This decision is made in step 112. If the connection is to be made at the present time, the implementation agent 38 is called upon to proceed to make the connection to the selected service provider in step 118.

5 If the connection is not to be made now, the information regarding when it should be sent is sent to the scheduled item agent 40 in step 116. At the appropriate time, the scheduled item agent then sends the information about the connection to the implementation agent in step 114 who then connects to the service provider in step 118 in the same manner.

10 Numerous additional modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

Claims:

1 1. An apparatus for selecting one of a plurality of
2 service providers which are available to a computer system
3 for connection to a network, the apparatus comprising:

4 at least one database containing data regarding various
5 parameters of the plurality of service providers and service
6 quality requirements for various service types;

7 a decision making unit connected to said at least one
8 database for selecting one of said plurality of service
9 providers, said selecting being made according to decision
10 making criteria and data from said at least one database.

11 2. The apparatus according to claim 1, further
12 comprising an interface unit for displaying to a user the
13 selected data provider.

14 3. The apparatus according to claim 1, further
15 comprising an implementation agent for connecting said
16 computer system to said selected provider.

17 4. The apparatus according to claim 1, further
18 providing a tracking unit for updating data in said at least
19 one database based on current conditions in said service
20 providers.

1 5. The apparatus according to claim 1, wherein said
2 decision making unit includes a criteria unit for providing
3 different criteria related to different selection parameters
4 and a decision making agent unit for making the decision
5 based on criteria from said criteria unit.

1 6. The apparatus according to claim 5, wherein said
2 decision making unit further includes a logic unit for
3 providing logic based on different decision criteria to said
4 decision making agent unit.

1 7. The apparatus according to claim 1, wherein said at
2 least one database includes a first database for storing
3 preconfigured service quality requirements of each normal
4 service type and a second database for storing parameters
5 regarding each provider, including billing data, selection
6 priority data, resource condition data and resource basic
7 information data.

1 8. A method of selecting one of a plurality of service
2 providers for connecting a computer system to a network,
3 said method comprising:
4 storing data in at least one database regarding
5 parameters of each service provider and service quality
6 requirements;
7 retrieving data from said at least one database;

8 selecting specific criteria for making a decision; and
9 selecting one of said plurality of providers based on
10 data from said at least one database and based on said
11 criteria.

1 9. The method according to claim 8, further
2 comprising:

3 providing logic based on different decision criteria so
4 that said selecting is also based on said logic.

1 10. The method according to claim 8, further
2 comprising displaying said selected provider to a user for
3 approval.

1 11. The method according to claim 10, further
2 comprising automatically connecting said computer system to
3 said selected provider.

1 12. The method according to claim 8, further
2 comprising:

3 updating said at least one database based on the real
4 time state of each provider.

1 13. The method according to claim 8, wherein said at
2 least one database includes a first database for storing
3 preconfigured service quality requirements for each normal
4 service type and a second database for storing resource

5 data concerning each provider, including billing policies,
6 selection priorities, resource condition data and resource
7 basic information.

1 14. A computer network system comprising:

2 a computer network;

3 a series of pathways to said network controlled by
4 service providers;

5 a computer system selectively connected to said
6 pathways;

7 a selection device for selecting which service provider
8 should be utilized when connecting the computer system to
9 the network, said selection device including at least one
10 database storing data regarding various parameters about
11 said service providers and service quality requirements and
12 a decision making unit for making said selection based on
13 said data stored in said at least one database and on
14 decision making criteria.

1 15. A networked communication system comprising:

2 a network arrangement;

3 a plurality of terminals communicating with said
4 network;

5 service providers maintaining access to said network
6 from said terminals;

7 a server containing data regarding charging
8 information of said service providers;

9 said server being accessible by said terminals so as to
10 obtain said charging information, said terminals selecting a
11 service provider based on said charging information.

1 16. The system according to claim 15, wherein said
2 service providers are application service provider services.

1 17. The system according to claim 16, wherein said
2 network is the internet and said service providers are
3 internet service provider services.

1 18. A system for selecting one of a plurality of
2 service providers for connecting a computer system to a
3 network, comprising:

4 means for storing data in at least one database
5 regarding parameters of each service provider and service
6 quality requirement;

7 means for retrieving data from said at least one
8 database;

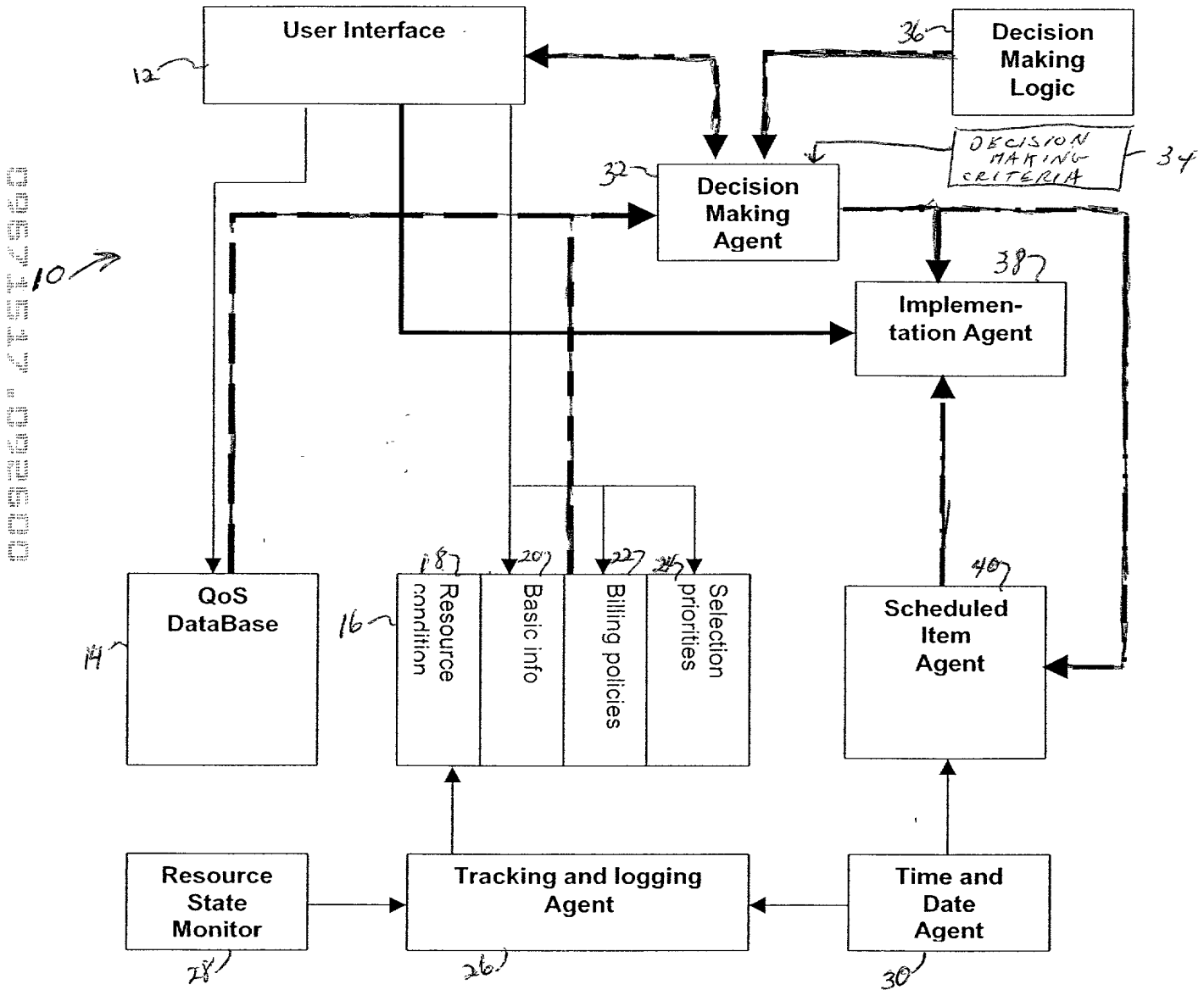
9 means for selecting specific criteria for making a
10 decision; and

11 means for selecting one of said plurality of providers
12 based on data from said at least one database and based on
13 said criteria.

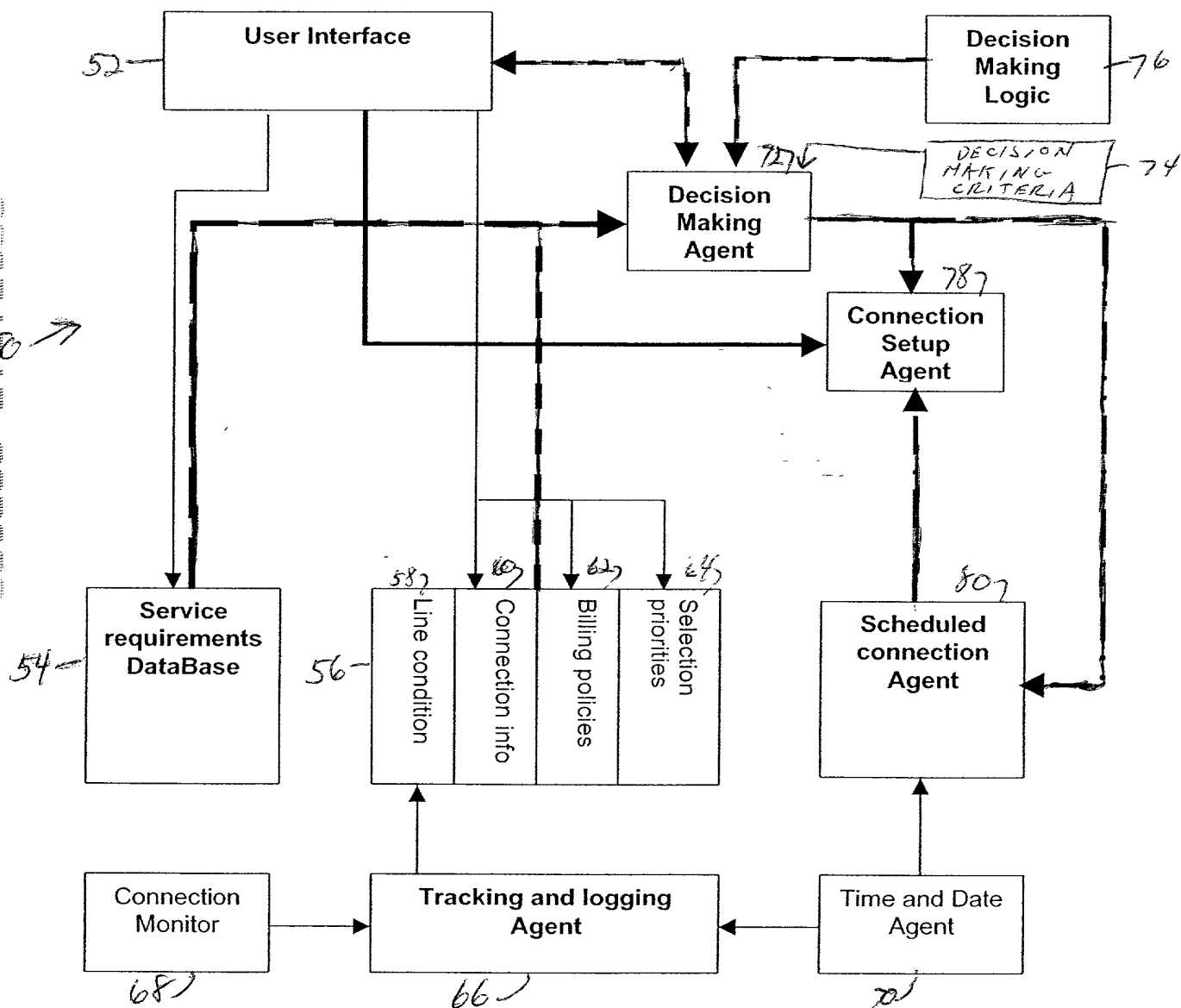
ABSTRACT OF THE DISCLOSURE

A system for selecting a data communications provider.
A decision making agent establishes a framework for making
the decision based on specific criteria and specific logic.
5 The decision making agent draws on databases which store the
quality of service requirements and the parameters regarding
each service provider. This information may be updated
automatically. When a decision is reached, it is suggested
to the user who either accepts it or overrides it and
10 manually inputs his own decision. The connection is then
made automatically or scheduled for later connection.

F16 1



SECRET



F 16 3

